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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 21 October 2003 with an application for Letters Patent number 529066 made by Vergence Technology Limited.

I further certify that pursuant to a claim under Section 24(1) of the Patents Act 1953, a direction was given that the application proceed in the name of Eliminator Holdings Limited.

Dated 11 November 2004.

PRIORITY DOCUMENT
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Neville Harris
Commissioner of Patents, Trade Marks and Designs



529066

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PATENTS FORM NO. 4

Appln Fee: \$50.00

James & Wells ref: 122817/25 VM

PATENTS ACT 1953

PROVISIONAL SPECIFICATION

ANTI-FOAMING DEVICE

We Vergence Technology Limited, a New Zealand company of 153-155 Ellis Street, Hamilton, New Zealand do hereby declare this invention to be described in the following statement:

ANTI-FOAMING DEVICE

TECHNICAL FIELD

This invention relates to an anti-foaming device.

In particular, this invention relates to an anti-foaming device for the use in animal
5 husbandry where the milking of an animal and the subsequent storage of that milk
is required.

Reference throughout the specification shall now be made to use of the present
invention in relation to the control of foaming in milk.

However, this should not be seen to be a limitation on the present invention in any
10 way as it may be used with any other fluid where foaming can occur under certain
temperature and pressure conditions.

BACKGROUND ART

The use of fluid treatment systems within the dairy industry is well known,
particularly for the collection and storing of milk from a herd of animals.

15 Historically milk was manually extracted from animals. Milk was generally
collected into a pail before being transferred to some form of holding tank prior to
its disposal.

The advent of electro-mechanical milking equipment not only greatly improved the
sanitation of the old system, it also improved the yield considerably.

20 Another improvement with the electro-mechanical system is that the operator could
milk more than one animal at a time.

The milk extracted from the animals was done so under a "system vacuum" (this reduced the air pressure within the milkline connected to the teat in order to extract the milk from the teat).

5 Due to the nature of both manual and electro-mechanical extraction of milk from an animal a volume of air becomes entrained within the milk prior to the milk entering a bulk storage tank.

Although the electro-mechanical milking systems overcome most of the problems associated with the previous manual milking method they do not overcome the problems associated with the introduction of entrained air into the product.

10 An extremely significant problem caused by the introduction of air is that under certain seasonal temperature conditions foaming of the milk will be more prevalent.

Another drawback of the presence of entrained air is that a greater volume is needed to store the product as the air increases the overall volume of the product.

15 This also introduces a further drawback for the farmer in that when tested the milk indicates that it has a lower milk solids content per litre due to the presence of the entrained air.

A further drawback with the introduction of air into the product is that it can encourage the proliferation of aerobic bacteria developing within the milk.

20 The improved fluid treatment system disclosed in New Zealand Patent Application No. 528893 overcomes all the aforementioned problems apart from the foaming of the milk under certain seasonal temperature conditions.

All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what

their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common
5 general knowledge in the art, in New Zealand or in any other country.

It is acknowledged that the term 'comprise' may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term 'comprise' shall have an inclusive meaning - i.e. that it will be taken to mean an inclusion of not only the
10 listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term 'comprised' or 'comprising' is used in relation to one or more steps in a method or process.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

15 Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

DISCLOSURE OF INVENTION

According to one aspect of the present invention there is provided an anti-foaming device, adapted to prevent foaming of a fluid within a fluid reservoir, the device
20 including,

a conduit, wherein the conduit is in contact with at least a part of the exterior surface of the fluid reservoir, and

a thermally conducted media, wherein the media is passed through the conduit, and

a heat transfer device,

characterised in that,

The heat transfer device controls the temperature of the media within the conduit to hold the temperature of the fluid below a foaming temperature.

- 5 Throughout the present specification the fluid should now be referred to as being milk however this should not be seen to be a limitation on the present invention as it is equally feasible for the present invention to be used with any other fluid that is prevalent to foaming under certain temperature and pressure conditions.

- 10 Throughout the present specification the media shall now be referred to as being water however this also should not be seen to be a limitation on the present invention as the media can be any flowable material, or combination of materials, capable of altering the temperature of the fluid within the fluid reservoir to a position outside the range at which it can foam.

- 15 In preferred embodiments of the present invention the media is pumped through the conduit to ensure an adequate flowrate of the media is achieved for an adequate level of heat transfer to occur between the media and the fluid.

- 20 It should also be appreciated that in preferred embodiments of the present invention the conduit is constructed as a spiral water jacket fitted around the surface of the fluid reservoir to ensure adequate media flow throughout the conduit in order to eliminate any dead-spots where the media flowrate is insufficient to adequately control the temperature of the fluid.

- 25 This should not however be seen to be a limitation on the present invention in any way as in other embodiments the conduit can be formed in other configurations than as a spiral and may even be constructed simply as an outer skin wherein the media flows between the outer skin and the fluid reservoir wall.

In preferred embodiments of the present invention the fluid reservoir should be understood to be at least part of the invention disclosed in New Zealand Patent Application No. 528893 and in particular the secondary chamber thereof.

5 This should not however be seen to be a limitation on the present invention in any way as in other embodiments the fluid reservoir can be other means for holding a volume of fluid, an example of which would be a standard milk storage tank.

The foaming of milk only occurs over a relatively small temperature range for any given pressure, therefore if the pressure at which the milk is held is known then the calculation at which temperature the milk is likely to foam would be quite straight
10 forward.

In conventional milking systems foaming of the milk can occur in milk lines as well as in the bulk storage container at certain times of the year.

This is due to seasonal temperature variations causing the temperature of the milk to reach the point at which foaming occurs.

15 This drawback is equally true for the device disclosed in New Zealand Patent Application No. 528893 although it should be noted that due to the thin film of milk on the surface of the secondary chamber the cooling of the milk will be far faster and more efficient due to the increased contact area for heat transfer.

It should also be noted that use of the present invention increases removal of
20 entrained air from within the milk as well as removing most of the natural vapours from within the milk and thereby further improving the organoleptics of the milk.

Another advantage of the present invention is that the water exiting the present invention can be used for other applications (such as teat washing) as in most applications cooling of the milk will be required and therefore the waste water will
25 have an increased temperature.

The waste water from the present invention can be used for other applications, examples of which would be cleaning down the equipment or the milking area.

From the foregoing it is clear that the present invention has a significant advantage over all the conventional milking systems available and can provide the
5 farmer and hence the consumer with a consistent and sweet smelling product throughout the year and which is unaffected by any seasonal temperature variations.

BRIEF DESCRIPTION OF DRAWINGS

Further aspects of the present invention will become apparent from the following
10 description which is given by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a diagrammatical representation of a sectional view of the present invention cut through its vertical mid-line.

BEST MODES FOR CARRYING OUT THE INVENTION

15 With reference to the figure there is illustrated an anti-foaming device generally indicated by arrow 1.

The anti-foaming device (1) is shown fitted to the improved fluid treatment system (disclosed in New Zealand Patent Application No. 528893).

It should be appreciated that this configuration is the most efficient shape for the
20 present invention as with the secondary chamber (3) having a vertically conical side wall (4), a thin film laminar flow is formed on at least part of its surface – which ensures a heat transfer between the milk contained within the secondary chamber (3) and the water flowing within the present invention (1) can take place quickly and effectively.

The anti-foaming device (1) is formed as a set of coils (5) fitted to the outside of the secondary chamber (3) of the improved fluid treatment system (2,3) in order that water pumped through the coils (5) achieves a good level of heat transfer, through the wall (4) of the secondary chamber (3), with the milk.

- 5 Water enters the anti-foaming device (1) at the water inlet (6) and circulates around the coils (5) until it leaves the coils at the water outlet (7).

The water can then be reused throughout the farm as required, or may simply be disposed of.

- Aspects of the present invention have been described by way of example only and
10 it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof.

VERGENCE TECHNOLOGY LIMITED

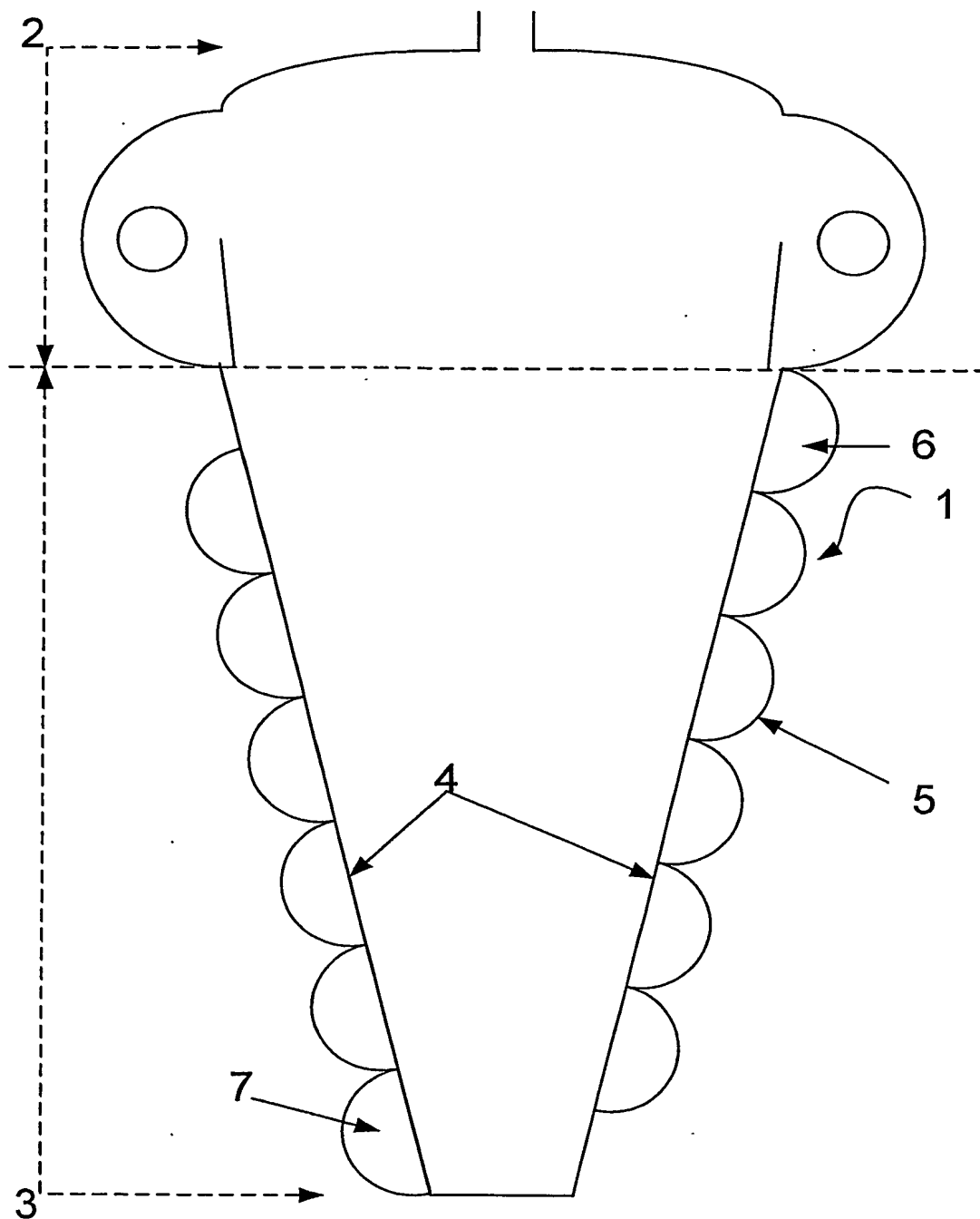
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JAMES & WELLS



FIG1



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